Putting Knowledge Reachback into Practice

Scott W. Lackey, Ph.D. ©2003

I N THE MARCH-APRIL 1998 *Military Review* article in which he launched the University After Next (UAN) initiative, General Montgomery C. Meigs created a vivid image of future operations.[1] Meigs described a scenario, set in 2014, in which a unit, presumably of battalion or brigade size with staffs even leaner than those of today, engages in frenetic preparations for deploying to an overseas contingency operation (CONOP). According to Meigs, knowledge is the commodity that units most urgently need.

A deploying force gains knowledge in many ways, such as from the collective knowledge of its members (the commander, principal staff, subordinate commanders, and soldiers) gained through real-world experiences or learned in Army schoolhouses and rehearsed and honed in realistic collective-training environments, such as at combat training centers (CTCs). Robust, effective linkages with realistic virtual simulated environments broaden knowledge gained at CTCs. Advanced collective training and higher education must rest, of course, on a solid base of individual self-development, training, and physical conditioning.

The Army cannot design training environments to meet every possible contingency, however. No educational program can anticipate all of the challenges its students will face. No body of collective wisdom gained from professional experience will give a unit, its commander and staff, its subordinate commanders, and its soldiers everything they will need to surmount every operational or tactical problem. Situations will arise that will require reaching back to external sources of knowledge.

Reaching back to higher headquarters, which traditionally enjoy larger staffs and larger reservoirs of knowledge, experience, and information, is not a new concept. What is new is the array of information resources now available in real time or near real time. Also new are the electronic networks used to deliver information from knowledge repositories, whether human or electronic, to those requesting knowledge.

Exploiting the full array of knowledge resources constitutes the challenge of Knowledge Reachback. The Center for Army Lessons Learned (CALL) has stepped up to this challenge. In 1998, Meigs, as the commander of the Combined Arms Center (CAC), chartered CALL as the U.S. Army Training and Doctrine Command (TRADOC) Project Office, UAN. The UAN charter tasked CALL to harness information and communications technologies to support warfighters; in essence, to create knowledge resources and tools that U.S. forces would need to effectively use knowledge resources.

Developing new technologies and implementing their widespread use across an organization as vast as the U.S. Army takes time, but CALL began the task with solid advantages. CALL possessed a vast reservoir of knowledge, including electronic repositories of its own lessons learned publications; training feedback products from the CTCs, dating from the early 1980s; observations made by trained subject-matter experts (SMEs) of U.S. Army operations since 1989; and Army and joint operational records and after-action reports from as far back as the Vietnam war. As an organization designed to collect and disseminate best practices and good ideas, CALL

was uniquely positioned to assume the role as a force for change and learning within the Army.

The ability to reach back and access knowledge and information when needed is key for any organization that confronts multifaceted challenges every day across the globe. The challenge is truly global, given continued forward basing of large parts of the Army and contingency operational deployments worldwide. Accordingly, CALL targeted the World Wide Web and other wide-area networks as global dissemination engines to make network-accessible knowledge available to the U.S. military user worldwide.

CALL uses Web technologies—

 To disseminate its own publications as well as Army and joint operational records and lessons learned.

 To direct Army, joint, Department of Defense (DOD), and other service users to other web-based sources of information.

 To assemble best-of-class search-engine capabilities that allow users to tame the vastness of networked knowledge resources.

Even with such powerful on-line capabilities, problems in disseminating needed information persist. Some people are still either unfamiliar with or not accustomed to using web-based resources on a regular basis. CALL uses its location at Fort Leavenworth to spread the word of the power and availability of its information resources to students of the Combined Arms and Services Staff School, the Command and General Staff College (CGSC), the School for Advanced Military Studies, and the pre-command courses.

However, sometimes it is not enough to know that on-line information technologies and resources are available to help commanders and staffs confront and overcome daily problems and challenges. They must have time to use these resources, and time is what most units lack, particularly in a crisis situation. The Army has already established a 96-hour timetable from initial alert to arrival in the theater of operations for the Stryker Brigade Combat Team, with only an additional 12 hours allowed for deploying an entire division. As a constraining factor, time, or the lack thereof, will only increase.

The knowledge, experience, and information readily available to a unit's higher headquarters might sometimes be insufficient to address immediate challenges. If so, the unit must be able to draw on a broader knowledge base that consists of an interactive mixture of electronic library and archival knowledge; analog reference; research resources; and SME networks or communities of practice. These resources must be linked via electronic means with the requesting unit and be capable of evaluating reports of the situation at hand and to propose and continuously evaluate various solutions and remedies across this knowledge base.

A unit reaches back or accesses these resources via communications linkages it has on hand, whether they are tactical radio, telephone, fax, or as is increasingly the case, electronic wide-area networks

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via the Internet, the classified Secure Internet Router Protocol Network (SIPRNet) or other theater-specific networks. Units will still largely work through chains of command to obtain needed information. However, with the increasing availability of computer networks to staffs operating in even relatively immature theaters and the increasing computer literacy among officers and noncommissioned officers (NCOs), staffs can obtain needed information and knowledge directly from remote sources across the knowledge base without lengthy coordination. Where to look for needed information and knowledge will become an increasingly significant staff-training issue for implementing effective Knowledge Reachback. CALL, in partnership with the Battle Command Training Program (BCTP), is already addressing the issue.

CALL's Knowledge-Management Capabilities

CALL has been a knowledge-management organization since its inception in 1985, long before the term became fashionable. CALL emerged as an Army organization because of a perceived knowledge-management failure on the part of the Army to capture, analyze, and disseminate the lessons learned of the units rotating through the National Training Center in the early to mid-1980s. CALL's rapid development of an effective observation, collection, analysis, and dissemination system quickly led

the Army to expand the lessons-learned system to include actual operations, beginning with Operation Just Cause in December 1989.

The emergence of the user-friendly World Wide Web interface with the Internet and the almost simultaneous union of CALL with the old Army Knowledge Network (AKN) Directorate in 1996 led to a dramatic evolution in the business of lessons learned. First, the definition of lessons learned broadened dramatically to include things from which an Army unit, leader, or individual soldier could derive

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immediate benefit. No longer did they have to wait for a CALL publication to arrive by regular mail at battalion or brigade headquarters; they could go on-line and retrieve CALL publications from the Web, conduct searches against their content, and read and absorb only those sections that were of direct and immediate benefit to them.

CALL posts all publications, with one exception, on its website in the hypertext markup language (HTML) mode. The exception includes the initial impressions reports that combined arms assessment teams generate. CALL fields initial impressions reports to collect lessons learned from CONOPs. Users desiring to download an entire CALL publication can do so in portable document format (PDF).

Unifying CALL with the AKN also led to creating the CALL database out of the old Army Historical Archives System. Users can retrieve thousands of records from recent Army operations, including operations plans, orders, fragmentary orders, after-action reports, standard operating procedures, message traffic, and other documents. Users of the CALL database can access these electronic documents either by drilling down through the archival hierarchy established by CALL historians and archivists or by using the powerful search engines available within the Excalibur archival software that CALL uses.

CALL operates three CALL databases: a public-access CALL database, a restricted-access CALL database, and a classified CALL database. CALL's public-access database consists primarily of Army publications, such as a complete electronic collection of *Military Review* dating from its inception in 1922. The database also contains CGSC Masters of Military Arts and Science theses and SAMS monographs that have been approved for public access. The restricted-access CALL database contains Army and joint operational records; lessons learned; and tactics, techniques, and procedures that are for official use only and have not been approved for public release. The public-access CALL database and the restricted-access CALL database are available from the CALL home page.[2] The restricted-access CALL database is password and ID protected, although U.S. Armed Forces and DOD civilian employees can obtain access by filling out an electronic on-line form. The classified CALL database contains classified Army and joint operational records and is available only on the classified SIPRNet. The classified CALL database has a separate electronic application process similar to the one for the restricted-access CALL database off of the CALL SIPRNet site.[3]

Initial fielding of the software included a powerful pattern search and retrieval engine, which searched against binary code patterns underlying text documents. This type of search capability allowed users to search for terms of which they were uncertain of the spelling; for example, "How do you spell Nebucanezzar Division?" But more important for the early and mid-1990s, the powerful pattern-search engine was able to compensate for over 40 percent of optical character recognition (OCR) errors on scanned documents. Many of the documents converted to digital format by the old AKN directorate had been of poor quality, sometimes being third, fourth, or even fifth-generation photocopies. The importance of the pattern-search engine has declined over time, however, because with the growth of the CALL database, its searches tend to yield too many hits for most users to absorb.

The CALL database also possessed Boolean and later concept-based search capabilities. Boolean searches retrieve information based on word relationships within a page of text; for example, this and that, this or that, this not that, and so on. Boolean searches are also exact searches and do not take into consideration misspellings caused by human error or by faulty OCRs. The Boolean capability of proximity searching for word relationships on the same page of text represents a powerful search technique. While sorting and limiting information retrieval in this fashion was not initially important, given

COL James L. Mowery of CALL confers with LTC Charles Bush and other artillerymen at Task Force Hawk's forward operating base in Albania, 8 June 1999.

CALL uses Web technologies to disseminate its own publications as well as Army and joint operational records and lessons learned; to direct Army, joint, DOD, and other service users to other web-based sources of information; [and also] to assemble best-of-class search-engine capabilities that allow users to tame the vastness of networked knowledge resources.

the small number of documents on-line, the gradual increase in size of the CALL database to its current 2.5 million pages has made Boolean searching an important technique for locating needed information quickly within the digital vastness of the CALL database.

Concept-based searching is the most recent addition to the search tools available within the CALL database, and it is the most immature in terms of capability. However, its ability to ferret out documents containing words with related meanings to the search terms entered is an important one that will lend itself to the eventual augmentation of the search engine by powerful thesauri, including the CALL thesaurus.

The CALL thesaurus also represents an important CALL contribution to knowledge management. CALL initiated the development of an in-house thesaurus because then-current military thesauri did not address to a sufficiently detailed degree the Army operational and tactical levels of war, which are the focus of CALL's lessons-learned program. The CALL thesaurus currently consists of about 20,000 individual terms, structured in relationship hierarchies. The CALL thesaurus is also directly linked to the Alta Vista Internet search engine, so users can search the Web for sites related to the terms they are researching. Many government agencies and private Internet technology companies are interested in obtaining the CALL thesaurus to integrate

into their search-engine products.

Since establishing its Web presence in 1995-1996, CALL has been vitally interested in providing users with advanced capabilities to search the World Wide Web in the most effective way possible. CALL has developed its own military domain search engine, which allows users to search the content of targeted military domain websites on the Internet and SIPRNet. The CALL military domain search engine is particularly valuable to the SIPRNet user, because its half-universal resource locator (URL), half-Internet protocol (IP) character makes the SIPRNet

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much harder to browse than the Internet. CALL also developed the concept-based knowledge-based discovery tool to allow users to refine network searches on the basis of word meanings and uses search engines such as the Mil.com search engine to help users pinpoint the location of needed information online. All of CALL's capabilities to search the Internet are posted on the CALL website for anyone to use, including the general public.

CALL provides a huge number of links to other websites of interest to the Army user and in deciding which sites to link to, it takes a broad view of what could be of possible interest to users. For example, CALL devotes an entire section of its website to media links, since it realizes that the media are often good sources of information on areas and situations that an Army unit might encounter in a CONOP. The news media also often offer a perspective valuable because of its variance from military sources. Of course, CALL also provides linkages to all major Army and other military sites of note.

Not knowing how to look or where to access these capabilities can pose a challenge, particularly under the stress of an actual CONOP. So, CALL and BCTP Operations Group Delta launched the Knowledge-Reachback initiative. They conceived Knowledge Reachback as a means of providing the

operational commander and staff with targeted Knowledge-Reachback assistance to achieve information dominance. Knowing where to look is what Knowledge Reachback brings to bear in support of the operational commander and staff.

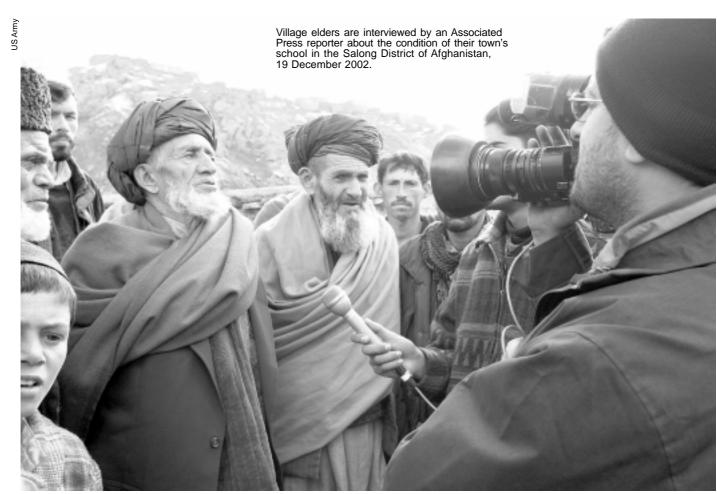## The CALL-BCTP Knowledge-Reachback Partnership

In June 1999, the U.S. Army confronted the challenge of the harsh, rugged, war-torn environment of Kosovo. With U.S. allies and partners, the Army entered the region with the common mission to return peace and stability to that strife-ridden country. Lieutenant General Mike Steele, CAC, recognized immediately that Kosovo would pose unique challenges to U.S. units. He instructed CALL and BCTP Operations Group Delta to develop a plan to put Knowledge Reachback into operation in support of U.S. Army forces in the Balkans.

Within a month, CALL and BCTP Operations Group Delta had devised an operational concept for Knowledge Reachback. They began using strike force battle staff rock drills and exercises that the Battle Command Battle Laboratory at Fort Leavenworth was testing. A CALL Knowledge-Reachback analyst served as a part of the Home Station Support Node (HSSN), and a BCTP Operations Group Delta observer-trainer monitored the use of Knowledge Reachback during exercises. The strike force exercises highlighted the need for effectively managing information requests within the deployed headquarters, overseen by the unit's chief of staff, to ensure that they were routed to the best source for information. The chief of staff could also ensure that requests were prioritized and given appropriate emphasis by the staff commensurate with their importance in meeting the commander's critical information requirements.

A rear-based activity, such as the HSSN, while it might be an effective provider of electronic information to a forward-deployed force, could never obtain clear enough or current enough visibility on events in the theater to be able to manage the request for information process from afar. Also, rear-based management might potentially overlook traditional sources of information within a unit's chain of command, which the unit could access more quickly and efficiently.

In January 2000, CALL and BCTP Operations Group Delta began the first operational test of Knowledge Reachback during the U.S. European Command (EUCOM) 2000 exercise. The exercise

US Army

Village elders are interviewed by an Associated Press reporter about the condition of their town's school in the Salong District of Afghanistan, 19 December 2002.

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yielded important lessons that would be reinforced repeatedly over the coming months. EUCOM 2000 was held at the Warrior Preparation Center (WPC) in Kaiserslautern, Germany, one of the U.S. military's premier exercise facilities, which possesses outstanding connectivity to a wide array of global electronic networks. However, when a question arose among EUCOM senior leaders during the seminar as to the number and status of hardened structures within a certain geographic area, BCTP Operations Group Delta reached back to CALL for the answer. Within an hour, using powerful network search engines put into place by CALL, Knowledge-Reachback analysts located a report detailing precisely the information requested, with imagery, and transmitted it to WPC for inclusion in the evening briefing to seminar participants. The important lesson learned was

that although the training staff and BCTP observer-trainers had access to vast networks from which to retrieve information, they were either completely absorbed in the planning and execution of the exercise operation or did not possess the knowledge to obtain the information needed from the electronic resources at their disposal. They needed the help of an extended, knowledge-management-savvy staff to locate critical data.

In March 2000, at the invitation of U.S. Army Europe (USAREUR), CALL and BCTP Operations Group Delta conducted an assessment to determine user needs for CALL's emerging Knowledge-Reachback capabilities. As hoped, the user-needs assessment yielded further lessons learned that had direct applicability to the fielding of Knowledge Reachback. First, the intelligence community,

particularly at Army level, viewed the reachback capabilities being fielded by CALL as duplicative and in direct competition with intelligence systems. Other communities at Army level, such as the operations

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Experience in Bosnia and Kosovo shows that the U.S. Army must also operate decisively and well with armies of nations with whom it has not traditionally enjoyed close relations. Therefore, in December 1999, CALL initiated a relationship with the Partnership for Peace (PfP) Consortium of Defense Academies and Security Studies Institutes.

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and special operations communities, viewed Knowledge Reachback as potentially beneficial to their functions. Corps and division staffs acknowledged that CALL Knowledge Reachback could provide them with critical information they needed on a daily basis. A division G2, even when informed of the negative response by the Army-level intelligence community, responded that he, at the division level, rarely received any information from Army-level intelligence systems.

In July 2000, with the Southern European Task Force exercise Lion Focus 2000, a CALL Knowledge-Reachback analyst was embedded with the deployed team from BCTP Operations Group Delta. This analyst located and retrieved lessons learned, country study, doctrinal, and other information BCTP observer-trainers needed to buttress the validity of their training points or to provide the training audience with information key to the execution of specific staff functions. Connectivity to wide-area networks at some of the training locations was limited and sometimes interrupted. When that occurred, information requests were forwarded to CALL rear Reachback analysts who could perform the research by using more robust network connections. The requested information was then sent to the forward analyst for dissemination to the observer-trainers. Even with fairly primitive modem connectivity, however, the forward-deployed Reachback analyst could obtain large amounts of requested information, proving that staffs operating even in fairly immature environments could interact with existing Knowledge-Reachback Web interfaces.

The CALL and BCTP Operations Group Delta relationship has grown since Lion Focus 2000. A CALL analyst accompanies the operations group on each of the exercises conducted outside of the con-

tinental United States. Each exercise adds to the experience of both organizations in using the Knowledge-Reachback capability. CALL continues to expand knowledge and information resources used to support BCTP and the training audience, obtaining access to new databases and new sources of information to populate existing and emerging databases. For example, a Bulgarian medical report on contagious diseases in refugee camps provided key lessons learned to the Third Army staff during exercise Lucky Sentinel.

BCTP Operations Group Delta increasingly relies on Knowledge Reachback to impart validity and credibility to training points made during exercises. More important, however, observer-trainers are increasingly viewing Knowledge Reachback as a resource for the training audience and for skill in using on-line reachback capabilities as a part of the training they offer to staffs. Beginning with the 2001 Lion Focus exercise, BCTP Operations Group Delta began to teach staffs how to directly access network Knowledge-Reachback resources and how to use the CALL Knowledge-Reachback team as a part of its training seminars.

The CALL-USAREUR Knowledge-Reachback Partnership

USAREUR served as a close partner in the CALL Knowledge-Reachback initiative almost from the beginning. Meigs had conceived Knowledge Reachback and the idea of extended staff support to the field across wide-area networks as an integral part of the UAN program that he founded at CALL while serving as CAC commander in 1998. Under Meigs' leadership, USAREUR made great progress in putting together key components of a knowledge system. From 1998 to 1999, the USAREUR deputy chief of staff for operations and plans (DCSOPS) established the Operational Records Preservation (ORP) program. USAREUR founded ORP in response to the lessons learned from the Persian Gulf war, when vast amounts of records were lost during the rapid redeployment of the U.S. Army from Southwest Asia. With ORP, USAREUR DCSOPS required units that deployed to Bosnia and later to Kosovo to preserve certain key records that documented the full spectrum of activities and operations and to retire them to specific electronic and hard-copy repositories. As a corollary to the ORP, the USAREUR lessons learned office catalogued large numbers of documents collected during the first stages of U.S. Army operations in Bosnia by mili-

US Army

A Russian 76th Airborne Division BTR 89 parks next to a U.S. 1st Armored Division Bradley Fighting Vehicle during a joint patrol near Zvornic, Serbia, 29 February 1996.

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The USAREUR lessons learned office, which organizationally fits within the USAREUR office of the deputy chief of staff for operations and plans, became natural partners in Knowledge Reachback to CALL and BCTP Operations Group Delta. Under a memorandum of understanding concluded between USAREUR headquarters and the TRADOC Deputy Chief of Staff for Training-West, USAREUR lessons learned analysts serve as the forward-deployed point of entry for information requests stemming from units deployed to the European theater. USAREUR lessons learned

analysts reach back to capabilities established by CALL on the Internet and SIPRNet to respond to USAREUR-generated requests for information and periodically forward them to CALL for answers.

In August 2000, USAREUR's 7th Army Training Command (7ATC) provided CALL with start-up funding for Knowledge Reachback. CALL used that funding to hire an additional contracted Knowledge-Reachback analyst to handle requests for information, establish SME networks using collaborative software technology procured by the CALL Project Office, UAN, and build other web-based on-line information resources tailored to user needs. CALL also procured the hardware and software needed to establish a website and database presence on the Linked Operations Centers-Europe (LOCE) network. The LOCE allows CALL to

reach U.S. staffs and other personnel operating within NATO headquarters and to make other CALL information and products more readily available to NATO allies.

In October 2000, CALL began integrating Knowledge Reachback with the 7ATC Deployable Operations Group (DOG) initiative. In 1999-2000,

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the 7ATC had established DOG as a focal point to facilitate the training capabilities and resources to U.S. forces deployed to the Balkans. As a forward-thinking organization, DOG considered information and knowledge as a training resource and worked hard to integrate Knowledge Reachback into the operational fabric of the European theater.

In spring 2001, the 7ATC included specific mention of CALL and USAREUR Knowledge-Reachback capabilities in the 180-day and 90-day-out packages it provides to units deploying in support of Stabilization Force and Kosovo Force units. The 7ATC also included information about USAREUR-CALL Knowledge Reachback in an appendix to the operations orders those units received. In a related initiative, USAREUR DCSOPS drafted a letter of instruction directing units within the European theater to take advantage of Knowledge-Reachback on-line capabilities and research assistance.

That the core CALL Knowledge-Reachback team that launched the initiative with USAREUR and the partnership with BCTP Operations Group Delta consists of four analysts is important to note. Three of these analysts have doctorate degrees, two of which are in military history, the third in Slavic languages. Two have Masters of Library Science degrees and extensive experience working in modern research libraries. Two have prior military experience, one being a recently retired lieutenant colonel of ordnance. All have mastered the use of electronic and traditional methods of obtaining needed knowledge and information.

Emerging Capabilities

The trend in U.S. military operations over the last decade indicates that the Army will continue to operate and cooperate with foreign armies. Accordingly, CALL has expanded the scope of its collection and dissemination mission to include collecting and disseminating foreign-generated information and knowledge. In 1998, CALL established a relationship with the American, British, Canadian, and Australian (ABCA) Standardization Program. ABCA is an international-armies program developed to ensure that the partners achieve agreed levels of interoperability and standardization necessary for two or more ABCA armies to operate effectively together within a coalition. The ABCA program approached CALL to develop a coalition operations database of lessons learned that would meet the program's stated objectives. CALL developed a low-cost, low-maintenance variant of existing CALL databases as well as an administrative system through which lessons learned and other reports flowed into the databases from validated sources. The highly successful ABCA database contains over 300 documents.

Great Britain, Australia, and Canada have long been U.S. allies. Strong political, military, and diplomatic ties exist between these countries. However, experience in Bosnia and Kosovo shows that the U.S. Army must also operate decisively and well with armies of nations with whom it has not traditionally enjoyed close relations. Therefore, in December 1999, CALL initiated a relationship with the Partnership for Peace (PfP) Consortium of Defense Academies and Security Studies Institutes. The idea for the consortium had emerged the previous year as part of a bilateral U.S.-German summit meeting, although PfP had existed as a NATO initiative for many years. CALL became associated with the PfP program when it concluded a memorandum of understanding with the Partnership for Peace Information Management System (PIMS).

PIMS looked at CALL's implementation of the ABCA Coalition Operations database and offered to collaborate with CALL to establish and field a similar database for PfP. CALL launched a lessons learned working group at the Second Annual PfP Consortium Conference at Sofia, Bulgaria, in December 1999. Within three months, CALL had fielded a prototype PfP lessons learned database and initiated staffing a user's guide for the database to members of the working group. The prototype was validated at the Third Annual PfP Consortium Conference at Tallinn, Estonia, in June 2000 and again

at a separate meeting of the working group at Fort Leavenworth in November 2000. Beginning in late 2000, CALL began to populate the PfP database with public-access information. In early 2001, CALL began to receive Bulgarian lessons learned for inclusion in the database. The PfP lessons learned database was finally approved at the Fourth Annual PfP Consortium Conference at Moscow in June 2001, where several new PfP countries expressed interest in getting involved with the working group.

In recent years, with CGSC, CALL has also purchased the capability for Army users to access knowledge-management repositories of tremendous importance and applicability to warfighters. The Periscope database contains information on weapons systems in use worldwide; unclassified orders of battle of military establishments across the globe; and a large number of important news and other reports on military topics. The ProQuest and EBSCO periodical databases are also important repositories of military, political, economic, and social knowledge and information of importance to commanders and staffs preparing to deploy to contingency theaters or who are already actively engaged in a CONOP.

The CALL Knowledge-Reachback team is constantly expanding its access to other non-CALL-administered databases. In recent months, the CALL Reachback team has obtained access to numerous logistic databases, including those of the Logistics Support Activity and the Defense Ammunition Center. CALL is also coordinating with Redstone Arsenal to integrate the scientific and technical databases of the materiel community. The UAN project office is also working with the intelligence community on a variety of technology initiatives, such as compiling a document from a variety of multiple sources.

While databases and web-based sources of information are and will remain an important capability within the context of Knowledge Reachback, CALL does not consider them its only ingredient. CALL sees in collaboration software technology the potential for truly interactive means of providing knowledge and information consumers with precisely the information they require. Collaborative software provides users the means to browse, read, write, or publish; that is, users become contributors to the knowledge system. Collaborative computing environments allow users to share ideas and applications remotely.

Collaborative software currently offers four general capabilities: on-line whiteboarding (information posting), audio conferencing, application sharing, and video conferencing. In contrast to standard e-mail that operates in an asynchronous mode, collaborative environments can provide answers to questions that are needed now or "yesterday." They also offer the potential for a remote group of users to produce a quality product derived from the knowledge and work efforts of other users dispersed across the globe. Collaborative environments, therefore, aim to foster productivity and innovation by tapping into the expertise of a diverse, dispersed group of SMEs.

The contracted CALL Knowledge-Reachback analyst took the collaborative Quickplace application, procured by the CALL Project Office-UAN to meet other knowledge-management challenges, and used it to establish a password and an ID-protected website to post response information given to

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customers of Knowledge Reachback since its inception in June 1999. The CALL Knowledge-Reachback team also established an informal SME network using the Quickplace application to help it respond to requests for information. The objective goal of Knowledge Reachback and the Warrior Knowledge Network within which it functions is to integrate the training and doctrinal knowledge base with that of the operational Army so cross-fertilization of knowledge and information becomes routine and systematic. This routine interaction will, in turn, ensure that the best possible knowledge and information gets forwarded to the individual user to help surmount everyday challenges encountered in the field or classroom or on the training battlefield.

Although CALL has not yet made widespread use of it, the Lotus Sametime collaborative software provides whiteboard capabilities, improved chat, synchronous application sharing, and improved notification to users to join an on-line meeting. Lotus Sametime carries the promise of immediate delivery to end-users of the knowledge and information product of a group effort.

CALL is also in the process of developing an on-line request for information (RFI) system. The CALL Defense Information Technology Test Bed prototyped the system in late 2000 and early 2001

and is currently adapting the prototype product for operational use. The RFI system allows users of the various CALL websites to submit requests for information electronically.

Unlike a general "e-mail the organization" button that exists on most websites, the RFI system will

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route requests for information via a CALL RFI manager to appropriate personnel for action. This promises to give the Knowledge-Reachback customer a faster, more expert response, and it will allow CALL to track exactly how much time and effort it expends in providing information and knowledge to the force. The initial pilot testing of the RFI system will include interface with CGSC's Combined Arms Research Library (CARL). This will allow CALL Knowledge-Reachback analysts to obtain rapid assistance from CARL librarians in obtaining needed information in analog or hard-copy formats. This last point, if taken to its logical conclusion in the full implication of an Armywide Knowledge-Reachback system, represents an important breakthrough, since much information and knowledge that field forces need remain in analog, hard-copy formats.

Implications

Two years of operational testing and experience have yielded some key lessons learned regarding the implementation of Knowledge Reachback. In turn, these offer implications as to the effort's future direction. When CALL and BCTP Operations Group Delta conducted the user-needs assessment with USAREUR in March 2000, operational and automation support staffs voiced concern about the effort. During the assessment, intelligence staffs at Army level charged that Knowledge-Reachback capabilities duplicated those of existing intelligence information systems and therefore were unnecessary and unneeded. Subsequent interviews with opera-

tional staffs at corps and division levels and experience in the field alongside the observer-trainers of BCTP Operations Group Delta demonstrated that units and staffs in the field often do not have access to specialized intelligence systems and applications. Because Knowledge Reachback mostly utilizes the Internet, it is available wherever the Internet is available, and the Internet is becoming increasingly available to unit headquarters at the battalion and higher levels, particularly in contingency operational environments.

USAREUR automation staffs voiced concerns about the availability of bandwidth needed to pass large quantities of digital information from repositories based in the continental United States to operational headquarters in-theater. This is a legitimate concern. In the majority of cases, responses to requests for information can be provided to end-users as e-mail attachments, with file transfer protocol being required in rare instances to transmit larger packets. The 2-megabite limit on attachments that generally still exists within most Army e-mail systems remains a limitation, but much of the information currently provided is in the form of electronic text documents where file sizes almost never pose a problem unless embedded graphics are present. And, while Knowledge Reachback is largely a computer network-based activity, it also uses older forms of communication such as telephone, fax, and regular mail.

CALL's experience in responding to requests for information, dating back far beyond the inception of Knowledge Reachback as a formal program, has shown repeatedly that the business of providing knowledge and information to soldiers and leaders is often an interactive process. The simple fact is that requesters often "don't know what they don't know." That is to say, they often initially have a hard time articulating what it is they actually want. This has certainly been the CALL experience with Knowledge Reachback during the first two years of its existence. But while the necessary dialogue to clarify the exact information needs of the requester takes time, it always results in a better and more useful product. There is no apparent technology quick fix to this problem, although improvements in database and network search capabilities continue to make searches against vast electronic repositories more effective in locating precise information. The widespread adoption and use of collaborative software might also facilitate and quicken the pace of dialogue between providers and end users of knowledge and information.

Another limitation of Knowledge Reachback is the primarily doctrinal and academic emphasis of the knowledge resources it accesses. This is a strength and a weakness because it was precisely such information that leaders and units could not readily obtain when deployed on a contingency or collective-training operation. CALL works continually to widen its access to additional information resources and databases to be able to provide a more comprehensive Reachback capability that extends into operational and logistical knowledge resources.

One of the major future challenges of Knowledge Reachback remains user education. Since the mid-1990s, CALL has emphasized making lessons learned available on-line via wide-area computer networks and web-enabled database applications; that is, making its knowledge resources available to Army users who have the computer savvy with which to access them. The computer literacy of Army officers, NCOs, and enlisted personnel has risen dramatically as an increasing percentage of those in the Army were born, have grown up with, and were educated with personal computers. But the range of computer applications at the desktop is still fairly large, and while the advent of Windows and Web browsers has created interface similarities, training in the use of individual pieces of software and database applications remains a requirement.

CALL sees an expansion of its Knowledge-Reachback program to support other BCTP operations groups as the means to meet this continual educational requirement while providing the operational force with a needed knowledge-management capability. BCTP trains and mentors all the Army's division and corps commanders and staffs on a systematic, routine basis. This is an appropriate level at which to make available the Knowledge Reachback capability, since these echelons possess the needed connectivity and automation resources to leverage and exploit it fully. This level is also appropriate for training staff officers and NCOs in the use of web-enabled knowledge and information resources.

Because BCTP observer-controllers and observer-trainers also augment operational staffs in time of war or other operational crises, it seems appropriate for the Knowledge-Reachback capability to be embedded in the training that all BCTP operations groups provide to the Army and in the day-to-day capabilities of operations groups. Since CALL

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and BCTP report to the TRADOC Assistant Deputy Chief of Staff for Training-West, such integration is possible and highly desirable from an organizational and a functional standpoint. BCTP and the commanders and staffs it trains would receive access to and training in the use of this important operational capability.

Knowledge Reachback currently represents an important knowledge-management capability and training resource. Many challenges lie ahead. If knowledge management is to survive and prosper within the Army, Army leaders must do two things.

First, they must provide coordinated direction and resource support to upgrade the Army's knowledge-management capabilities. Currently, many Army organizations and initiatives have this as their mission, but their efforts are often uncoordinated and sometimes conflicting. Only decisive leadership that ends organizational turf wars will ensure the systematic, intelligent fielding of important knowledge-management capabilities, such as knowledge portals, electronic communities of practice, improved data-mining, multilevel security access, and so on.

Second, Army leaders must be dedicated to expanding training in the use of Information Age innovations. Dedicated research capabilities will be needed in the future, and the fast pace of Information Age operations will demand that those on the ground possess the ability to access on-line information resources quickly and with great skill. If they cannot, Army forces will risk losing information dominance, which doctrine identifies as being the cornerstone of future military success. **MR**

NOTES

1. GEN Montgomery C. Meigs, "University After Next," *Military Review* (March-April 1998): 37.
2. The CALL Web page can be accessed at <http://call.army.mil>.
3. The CALL SIPRNet site can be accessed at <http://call.army.smil.mil>.

Scott W. Lackey is Chief, Research Division, Center for Army Lessons Learned, Fort Leavenworth. He received a B.A. from Ohio Wesleyan University and an M.A. and Ph.D. from the University of North Carolina, Chapel Hill. He is the author of numerous publications, including Rebirth of the Hapsburg Army: General Friedrich Beck and the Rise of the General Staff.